ORSETT BRIEFING PAPERS FOR PSYCHOLOGISTS

No.3 - Quasi-Experimental Designs

"True" Experiments

A "true" experiment, rather than a "quasi-experimental" design will have a number of controls:

i) The random assignment of the participants to the conditions (known as randomisation).

ii) Standardised procedures in all conditions, except for the independent variable.

iii) Control over the variables in the experiment. In particular, the independent variable (controlled by the experimenter) can be clearly seen to lead to behaviour change (the dependent variable). Confounding variables should be eliminated if possible or compensated for. Otherwise confounding variables can render an experiment's results as untrustworthy; ie: it is not clear that the independent variable caused the dependent variable.

The Quasi-Experiment

Quasi-experiments can be defined as "experiments that have treatments, outcome measures, and experimental units, but do not use random assignment to create the comparisons from which treatment-caused change is inferred" [1].

[1] Cook, T.D & Campbell, D.T (1979) Quasi-Experimentation: Design and Analysis for Field Settings Chicago: Rand McNally.

Many pieces of research are classed as experiments when in fact they are quasi-experiments. This is important because the experiment is the only method by which causation can be established. Quasi-experiments do not have the randomisation of participants or the clear control of variables found in "true" experiments.

In some cases, it can be like splitting hairs as to whether the independent variable is really manipulated by the researchers.

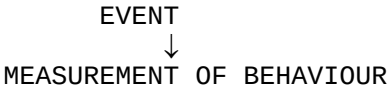
Natural Experiment

The investigator observes the consequences of some natural event on individual's behaviour. There may be a control group, but the researcher did not or could not manipulate the independent variable.

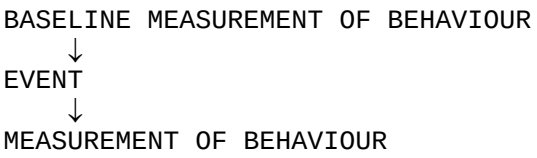
One example of this design is comparing the effects of experiencing a tornado with those who never experienced the event. The event is random; the participants are assigned randomly on that basis; one group experiences the independent variable (the tornado); and both groups are measured for the dependent variable.

There are three variations on the natural experiment design:

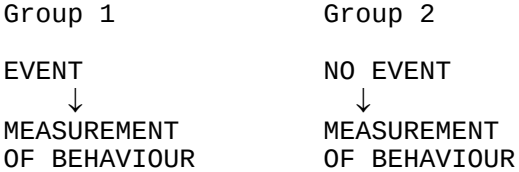
i) One shot case study - measurement of one group after the event only.



ii) One group pre-test post-test design - as (i) but a baseline measurement is also possible.



iii) Static group comparison - the comparison of two groups after the event only.



Pseudo-Experiment

Experiments using gender, for example, as the independent variable cannot truly randomise the participants. It is not possible for the participants to be in either condition. Here gender is a example of a "quasi-independent variable" [2].

Ex Post Facto Experiment

The dependent variable has already occurred and the attempt is made to find the independent variable. This is also called "retrospective experiments" [3].

Interrupted Time-Series Design

This method compares data before and after particular events, but usually where only one group used. Measurement is traditionally taken more than once, and over a period of time, rather than the snap-shot measurement of other methods. This can be similar to as longitudinal study.

There are a number of confounding variables during a study over a long period of time [4]:

i) Maturation - changes due to participants ageing, particularly with children.

ii) History - events that influence behaviour other than those being studied.

iii) Testing - repeated measurement influences behaviour, and knowledge that individuals are being studied changes their behaviour.

iv) Instrumentation - changes in the methods of collection of the data over the study.

v) Selection - groups not equivalent when groups being compared. Multiple time-series design uses more than one group.

vi) Attrition - loss of participants over time can bias the sample of participants left in the study.

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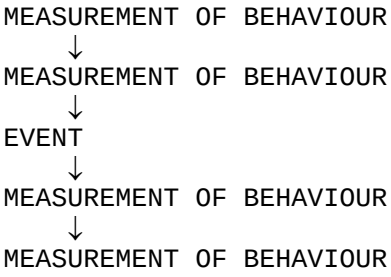
[2] Leary, M.R (2001) Introduction to Behavioural Research Methods (3rd ed) Boston: Allyn & Bacon.
[3] Robson, C (1993) Real World Research Oxford: Blackwell.
[4] op cit Cook & Campbell.

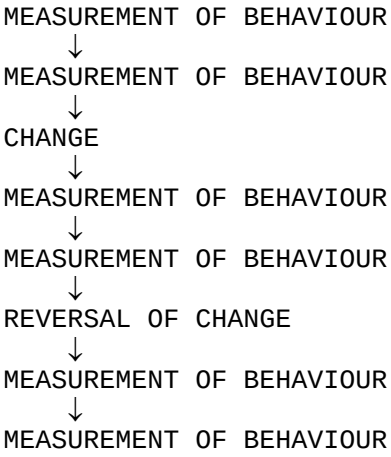
Often the technique is used in social science to measure the general effect of a change in the law. The classic example is a change in the speed limit and traffic accidents.

There are a number of variations of the interrupted time-series design [5]:

i) Simple interrupted time-series design.



ii) Interrupted time-series design with reversal - this looks at the effect of the change, and then later the reversal of that change.



iii) Interrupted time-series design with multiple replications - as (i) but the event being studied occurs a number of times.

[5] op cit Leary.

MEASUREMENT OF BEHAVIOUR
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MEASUREMENT OF BEHAVIOUR
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MEASUREMENT OF BEHAVIOUR
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MEASUREMENT OF BEHAVIOUR
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MEASUREMENT OF BEHAVIOUR

iv) Control group with interrupted time-series design - similar to (i) but with comparison or control group. Also known as "time series with non-equivalent control group (TSNECG)" [6].

Group 1	Control group
MEASUREMENT OF BEHAVIOUR	MEASUREMENT OF BEHAVIOUR
↓	↓
MEASUREMENT OF BEHAVIOUR	MEASUREMENT OF BEHAVIOUR
↓	↓
CHANGE	NO CHANGE
↓	↓
MEASUREMENT OF BEHAVIOUR	MEASUREMENT OF BEHAVIOUR
↓	↓
MEASUREMENT OF BEHAVIOUR	MEASUREMENT OF BEHAVIOUR

Non-Equivalent Control Group Design (NECG)

It may not be possible to randomise the participants, or have matched groups, or treat the conditions the same. For example, baseline measure for one group but not another.

It is possible to distinguish two variations of this design:

a) Non-equivalent group post-test only design - measurement made after the treatment (similar to natural experiments).

[6] Fife-Schaw, C (1995) Quasi-experimental designs. In Breakwell, G.M et al (eds) Research Methods in Psychology London: Sage.

Group 1	Control group
EVENT	NO EVENT
↓	↓
MEASUREMENT OF BEHAVIOUR	MEASUREMENT OF BEHAVIOUR

b) Non-equivalent group pre-test post-test design - baseline measurements taken as well.

Group 1	Control group
BASELINE MEASUREMENT	BASELINE MEASUREMENT
↓	↓
EVENT	NO EVENT
↓	↓
MEASUREMENT OF BEHAVIOUR	MEASUREMENT OF BEHAVIOUR

SOURCES

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